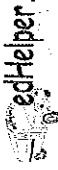


A "Matter" of Moving

By Trista L. Pollard

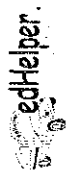


1. What's the matter in the Earth system? You are the matter! In fact, all living organisms and nonliving substances are **matter**. Matter, anything that has mass and takes up space, cycles through our Earth system continuously. A **system** is an organized group of parts that work together as a whole. Our planet has four major spheres or systems- **biosphere**, **hydrosphere**, **atmosphere**, and **geosphere**- that work together to keep our planet running smoothly. Before we cycle through the spheres, let's talk about systems in general.
2. All systems have energy and matter that move through them continuously. However, the movement of energy and matter within a system varies. In a **closed system** energy flows into and out of the system. Matter in a closed system does not enter or leave. Earth, along with terrariums, is a closed system. In **open systems** both matter and energy move into and out of the system. Earth's four spheres are open systems. These four spheres work together to form one large closed system called Earth.
3. If we could see our atmosphere, we would notice a mixture of gases that surround and protect our planet. The largest amounts of gas are nitrogen (about 70 percent) and oxygen (about 20 percent). There is also water vapor, carbon dioxide, and smaller amounts of other gases. Our atmosphere works together with other spheres to form our planet's **weather** patterns. For example, the Earth's **water cycle** occurs in our hydrosphere and atmosphere produces precipitation. Our hydrosphere includes all of the oceans, lakes, glaciers, surface water, and underground water on Earth. The planet is covered by nearly 75 percent water. You would be amazed to know that only 3 percent of our water is fresh and drinkable. The majority of our water is frozen in glaciers or at the Earth's poles. As you may have guessed the hydrosphere also affects the other systems on our planet. When the cold and warm ocean currents combine with the winds from the atmosphere, we see a change in our weather.
4. The biosphere is where we belong. This sphere includes all living organisms on the land, in the air, and in the water. Similar to the other two spheres, the biosphere also affects the other systems. Remember, it's the plants and the trees on Earth that take in carbon dioxide and release oxygen into the atmosphere. The last sphere, the geosphere, includes our planet's rocks and soil on the continents and on the ocean floor. It also includes the solid and flowing rock under the Earth's surface. When scientists study the geosphere, they look at our continents, mountains, sea floor, and interior layers. **Seismologists**, scientists who study earthquakes, have learned quite a bit about the inside of the Earth. By studying seismic waves or the energy that travels through the Earth from earthquakes, scientists have learned about the planet's different layers. They use the seismic waves to map how energy moves inside our planet. The outside of our planet is just as important.
5. Once we were able to travel into space, our view of the Earth changed completely. Scientists now use satellites and computers on airplanes to take images of our planet. This technology lets scientists learn more about the Earth's spheres. If we understand how energy and matter move through each sphere, then we can understand how each sphere affects the Earth system.

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1. What is the main idea of this article?	2. Suppose a new housing community/development is being built in your area. This new development will have 25 single-family homes and two streets. How would each sphere be affected by the construction of this new community?
3. In a system, all of its parts work together to help the system work effectively. Explain how each sphere works together with the other spheres to move matter and energy throughout the Earth system.	4. One week after the largest snow storm of the year, the temperatures rise, and there is a huge thawing of the snow and ice in your neighborhood. Which spheres will be affected by the sudden thaw? How will they be affected?
5. The biosphere includes the _____ on Earth. <input type="radio"/> A. Nonliving substances <input type="radio"/> B. Rivers, oceans, lakes, surface, and underground water sources <input type="radio"/> C. Rocks and soil <input type="radio"/> D. Living organisms and nonliving substances	6. Compare open and closed systems.
7. Scientists learn about the inside of the Earth by studying _____. <input type="radio"/> A. Mountain formations <input type="radio"/> B. Surface weathering <input type="radio"/> C. Surface erosion <input type="radio"/> D. Seismic waves and earthquakes	8. Explain how Earth can be both a closed and an open system.